

Practitioner's Docket No. AP8957

CHAPTER II

**TRANSMITTAL LETTER
TO THE UNITED STATES ELECTED OFFICE (EO/US)**

(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

PCT/EP98/01366 ✓	10/March/1998	10/March/1997 ✓
INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED

Motor Driven Pump Unit ✓
TITLE OF INVENTION

Hans-Dieter Reinartz; Dieter Dinkel; Jochen Burgdorf; Günter Kiehnle
APPLICANT(S)

Box PCT
Assistant Commissioner for Patents
Washington D.C. 20231
ATTENTION: EO/US

NOTE: To avoid abandonment of the application, the applicant shall furnish to the USPTO, not later than 20 months from the priority date: (1) a copy of the international application, unless it has been previously communicated by the International Bureau or unless it was originally filed in the USPTO; and (2) the basic national fee (see 37 C.F.R. § 1.492(a)). The 30-month time limit may not be extended. 37 C.F.R. § 1.495.

WARNING: Where the items are those which can be submitted to complete the entry of the international application into the

CERTIFICATION UNDER 37 C.F.R. 1.10*

(Express Mail label number is **mandatory**)

(Express Mail certification is optional.)

I hereby certify that this correspondence and the documents referred to as attached therein are being deposited with the United States Postal Service on this date 9-8-99, in an envelope as "Express Mail Post Office to Addressee," Mailing Label Number EL323239432US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Joyce Krumpke
(type or print name of person mailing paper)

Joyce Krumpke
Signature of person mailing paper

WARNING: Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

***WARNING:** Each paper or fee filed by "Express Mail" **must** have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. 1.10(b).
"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 C.F.R. §1.10 must be used (since international application papers are not covered by an ordinary certificate of mailing - See 37 C.F.R. §1.8.

NOTE: Documents and fees must be clearly identified as a submission to enter the national state under 35 USC 371 otherwise the submission will be considered as being made under 35 USC 111. 37 C.F.R. § 1.494(f).

1. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. 371:

- a. ☒ This express request to immediately begin national examination procedures (35 U.S.C. 371(f)).
- b. ☒ The U.S. National Fee (35 U.S.C. 371(c)(1)) and other fees (37 C.F.R. § 1.492) as indicated below:

2.Fees

CLAIMS FEE	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
[]*	TOTAL CLAIMS	13 - 20 =		x \$ 18.00 =	\$
	INDEPENDENT CLAIMS	1 - 3 =		x \$ 78.00 =	
	MULTIPLE DEPENDENT CLAIM(S) (if applicable) + \$260.00				
BASIC FEE**	<input type="checkbox"/> U.S. PTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where an International preliminary examination fee as set forth in § 1.482 has been paid on the international application to the U.S. PTO: <input type="checkbox"/> and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Article 33(2) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 CFR 1.492(a)(4)) \$96.00 <input type="checkbox"/> and the above requirements are not met (37 CFR 1.492(a)(1)) \$670.00 <input checked="" type="checkbox"/> U.S. PTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no international preliminary examination fee as set forth in § 1.482 has been paid to the U.S. PTO, and payment of an international search fee as set forth in § 1.445(a)(2) to the U.S. PTO: <input type="checkbox"/> has been paid (37 CFR 1.492(a)(2)) \$760.00 <input type="checkbox"/> has not been paid (37 CFR 1.492(a)(3)) \$970.00 <input checked="" type="checkbox"/> where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 CFR 1.492(a)(5)) \$840.00				
	Total of above Calculations				= 840.00
SMALL ENTITY	Reduction by ½ for filing by small entity, if applicable. Affidavit must be filed. (note 37 CFR 1.9, 1.27, 1.28)				-
	Subtotal				840.00
	Total National Fee				\$ 840.00
	Fee for recording the enclosed assignment document \$40.00 (37 CFR 1.21(h)). (See Item 13 below). See attached "ASSIGNMENT COVER SHEET".				
TOTAL	Total Fees enclosed				\$ 840.00

*See attached Preliminary Amendment Reducing the Number of Claims.

- i. ☐ A check in the amount of _____ to cover the above fees is enclosed.
ii. ☒ Please charge Account No. 18-0013 in the amount of \$ 840.00.
A duplicate copy of this sheet is enclosed.

****WARNING:** "To avoid abandonment of the application the applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of 30 months from the priority date: * * * (2) the basic national fee (see § 1.492(a)). The 30-month time limit may not be extended." 37 C.F.R. § 1.495(b).

WARNING: If the translation of the international application and/or the oath or declaration have not been submitted by the applicant within thirty (30) months from the priority date, such requirements may be met within a time period set by the Office. 37 C.F.R. § 1.495(b)(2). The payment of the surcharge set forth in § 1.492(e) is required as a condition for accepting the oath or declaration later than thirty (30) months after the priority date. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than thirty (30) months after the priority date. Failure to comply with these requirements will result in abandonment of the application. The provisions of § 1.136 apply to the period which is set. Notice of Jan. 3, 1993, 1147 O.G. 29 to 40.

3. ☒ A copy of the International application as filed (35 U.S.C. 371(c)(2)):

NOTE: Section 1.495 (b) was amended to require that the basic national fee and a copy of the international application must be filed with the Office by 30 months from the priority date to avoid abandonment "The International Bureau normally provides the copy of the international application to the Office in accordance with PCT Article 20. At the same time, the International Bureau notifies applicant of the communication to the Office. In accordance with PCT Rule 47.1, that notice shall be accepted by all designated offices as conclusive evidence that the communication has duly taken place. Thus, if the applicant desires to enter the national stage, the applicant normally need only check to be sure the notice from the International Bureau has been received and then pay the basic national fee by 30 months from the priority date." Notice of Jan. 7, 1993, 1147 O.G. 29 to 40, at 35-36. See item 14c below.

- a. ☒ is transmitted herewith.
b. ☐ is not required, as the application was filed with the United States Receiving Office.
c. ☐ has been transmitted
i. ☐ by the International Bureau.
Date of mailing of the application (from form PCT/IB/308): _____.
ii. ☐ by applicant on _____.
Date

4. ☒ A translation of the International application into the English language (35 U.S.C. 371(c)(2)):
a. ☒ is transmitted herewith.
b. ☐ is not required as the application was filed in English.
c. ☐ was previously transmitted by applicant on _____.
Date
d. ☐ will follow.

5. ☐ Amendments to the claims of the International application under PCT Article 19 (35 U.S.C. 371(c)(3)):

- iii. ☒ they were reviewed by the inventor as required by 37 C.F.R. 1.70.
☐ will follow.

Other document(s) or information included:

11. ☒ An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):
- a. ☒ is transmitted herewith.
 - b. ☐ has been transmitted by the International Bureau.
Date of mailing (from form PCT/IB/308): _____.
 - c. ☐ is not required, as the application was searched by the United States International Searching Authority.
 - d. ☐ will be transmitted promptly upon request.
 - e. ☐ has been submitted by applicant on _____.
Date

12. ☒ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98:
- a. ☒ is transmitted herewith.
Also transmitted herewith is/are:
☒ Form PTO-1449 (PTO/SB/08A and 08B).
☒ Copies of citations listed.
 - b. ☐ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. 371(c).
 - c. ☐ was previously submitted by applicant on _____.
Date

13. ☐ An assignment document is transmitted herewith for recording.

A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

14. ☒ Additional documents:
- a. ☐ Copy of request (PCT/RO/101)
 - b. ☒ International Publication No. WO98/40954
 - i. ☐ Specification, claims and drawing
 - ii. ☒ Front page only
 - c. ☒ Preliminary amendment (37 C.F.R. § 1.121)
 - d. ☐ Other

15. ☒ The above checked items are being transmitted
a. ☒ before 30 months from any claimed priority date.
b. ☐ after 30 months.
16. ☐ Certain requirements under 35 U.S.C. 371 were previously submitted by the applicant on _____, namely:

AUTHORIZATION TO CHARGE ADDITIONAL FEES

WARNING: Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges if extra claims are authorized.

NOTE: "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

NOTE: "Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

☒ The Commissioner is hereby authorized to charge the following additional fees that may be required by this paper and during the entire pendency of this application to Account No. 18-0013.

☒ 37 C.F.R. 1.492(a)(1), (2), (3), and (4) (filing fees)

WARNING: Because failure to pay the national fee within 30 months without extension (37 C.F.R. § 1.495(b)(2)) results in abandonment of the application, it would be best to always check the above box.

☒ 37 C.F.R. 1.492(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possible when dealing with amendments after final action.

☒ 37 C.F.R. 1.17 (application processing fees)

☒ 37 C.F.R. 1.17(a)(1)-(5)(extension fees pursuant to § 1.136(a).

☐ 37 C.F.R. 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of

Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).

NOTE: 37 C.F.R. 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying . . . issue fee." From the wording of 37 C.F.R. § 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

[X] 37 C.F.R. § 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date).


SIGNATURE OF PRACTITIONER

Reg. No.: 33,373

Joseph V. Coppola, Sr.
(type or print name of practitioner)

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AP8957 (64098-0723)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Reinartz et al

Serial No.:

Group Art Unit:

Filed:

Herewith

Examiner:

For:

MOTOR-DRIVEN PUMP UNIT

Attorney Docket No.: AP8957 (64098-0723)

Paper No.

Assistant Commissioner of Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Dear Sir:

Please amend the application as follows prior to examination on the merits.

IN THE CLAIMS

Please cancel claims 1-13 and add the following new claims.

14. (New) A motor-driven pump unit, in particular for antilock systems of motor vehicles, comprising:

an electric motor that is arranged on one side of a pump unit and fastened thereto,
an electronic unit that is arranged on another side of the pump unit and fastened thereto,

means for mounting carbon brushes in an axially movable manner and means for the electric contacting of the carbon brushes in connection with the axial installation of the unit.

15. (New) A motor-driven pump unit according to Claim 14, wherein the mounting means is arranged at the level of the pump housing.

16. (New) A motor-driven pump unit according to claim 14, wherein the electronic unit is provided with the means for mounting and contacting the carbon brushes in order to form an electric constructional unit.

17. (New) A motor-driven pump unit according claim 14, wherein the electronic unit has at least two guide elements for the carbon brushes, which are effective parallel to a rotary axis of a rotating shaft of the motor unit.

18. (New) A motor-driven pump unit according claim 17, wherein the guide elements are arranged in alignment with a commutator having a contact surface that is at a right angle to the rotary axis.

19. (New) A motor-driven pump unit according to claim 18, wherein each guide element has a box that is open towards the motor for holding one of the carbon brushes in an axially movable manner.

20. (New) A motor-driven pump unit according claim 19, wherein each box is limited by a stop surface at an end facing away from the motor.

21. (New) A motor-driven pump unit according to claim 20, wherein the stop surface is acted upon by a pressure spring, whose other end acts upon a carbon brush in the direction of the commutator.

22. (New) A motor-driven pump unit according to claim 19, wherein the guide elements are arranged at the ends of at least one protruding arm.

23. (New) A motor-driven pump unit according to claim 22, wherein protruding arms are provided corresponding to the number of carbon brushes.

24. (New) A motor-driven pump unit according to claim 23, wherein said at least two protruding arms are arranged concentrically to the motor shaft.

25. (New) A motor-driven pump unit according to claim 24, wherein arms extend parallel to the axis of the motor shaft in the direction of the motor.

26. (New) A motor-driven pump unit according to claim 25, wherein said at least two protruding arms extend through the pump unit.

REMARKS

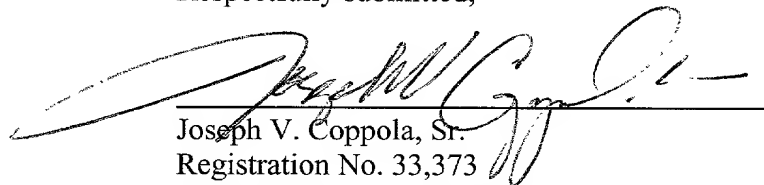
Prior to a formal examination of the above-identified application, acceptance of the new claims and the enclosed substitute specification (under 37 CFR 1.125) is respectfully requested. It is believed that the substitute specification and new claims will facilitate processing of the application in accordance with M.P.E.P. 608.01(q). The substitute specification and new claims are in compliance with 37 CFR 1.52 (a and b) and, while making no substantive changes, are submitted to conform this case to the formal requirements and long-established formal standards of U.S. Patent Office practice, and to provide improved idiom and better grammatical form.

The enclosed substitute specification is presented herein in both marked-up and clean versions.

STATEMENT

The undersigned, an attorney registered to practice before the office, hereby states that the enclosed substitute specification includes the same changes as are indicated in the mark-up copy of the original specification. The substitute specification contains no new subject matter.

Respectfully submitted,



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09/380817
514 Rec'd PCT/PTO 08 SEP 1999
AP8957 (64098-0723)

CERTIFICATE OF MAILING

I hereby certify that the enclosed Preliminary Amendment is being deposited with the United States Postal Service on the date shown below with sufficient postage as Express Mail Post Office to Addressee mailing Label Number EL323239432^U in an envelope addressed to the: Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Date: 9/8/99

By: Joyce A. Krumpe
Joyce A. Krumpe

R0063852.DOC

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SUBSTITUTE SPECIFICATION: MARKED UP COPY

AP8957 (64098-0723)

MOTOR-DRIVEN PUMP UNIT**Technical Field**

The present invention relates to a motor-driven pump unit, in particular for antilock systems of motor vehicles[, with the characteristics described in the preamble of Patent Claim 1].

Background of the Invention

A motor-driven pump unit of this type already is disclosed in EP 645 875 B1. It comprises an electric motor arranged on one side of a pump unit and an electronic unit arranged on another side of the pump unit. A commutator is mounted at the shaft end of the electric motor that faces away from the pump, and this commutator is acted upon by radially arranged carbon brushes. A supply line that runs through the motor and pump housing up to the electronic unit supplies power to these carbon brushes. The motor-driven pump unit can be improved, because measures have to be taken that the carbon brushes and the brush holding plate can be lowered radially to the commutator after mounting the rotor and the motor housing. For this reason, special tubular brush-holders for the carbon brushes have been proposed, with which the brushes would be held in a retracted position and could be pushed radially out of the tubular brush-holder in the direction of the commutator after a releasing device is activated. However, the tubular brush-holders are no longer accessible after the brush holding plate and motor housing have been mounted, and this is an added problem.

Another disadvantage is that the overall length of the unit increases in relation to the width of the commutator. Little mounting space and particularly a short overall length count among the basic requirements for a unit for motor vehicles. Hence, the object of the present invention is to propose a motor-driven pump unit that can be assembled easily and [requires only slight space] is very small in its assembled state. Furthermore, the contacting between the electrical components is to be simplified.

This object is solved [on the basis of the characteristic features of Patent Claim 1] by the present invention by providing means for an axially movable holding device and for the electric contacting of carbon brushes in connection with an axial installation of the unit. Due to the axially movable arrangement of the carbon brushes, it is [no longer] not necessary to hold back the carbon brushes during certain installation steps on the one hand, and on the other hand the overall length of the entire unit is essentially rendered independent of the width of the

commutator because, according to the invention, an axially effective commutator can be used. And, finally, the motor according to the invention does not require a brush holding plate.

Brief Description of the Drawing

[Further embodiments of the invention are disclosed in sub-claims in connection with the descriptions and drawing. In the following, the invention is described in detail on the basis of]

Figure 1, [which] shows a sectional view of a motor-driven pump unit according to the invention.

Detailed Description of the Preferred Embodiments

A motor-driven pump unit 1 is used especially for antilock systems in motor vehicles. It comprises an electric motor 2, which is mounted on one first side 3 of a pump unit 4 with a pump housing 5 and fastened thereto. An electronic unit 7 with a housing 8 is mounted on another second side 6 of the pump housing 5 and fastened thereto. The electronic unit 7 basically serves to activate electromagnetic valves (not shown) used for regulating the brake pressure in brake circuits. The electric motor 2 has a pot-shaped housing 9. Inside the housing there is a motor shaft 10 with a rotor 11 that has an armature 12 and windings 13. An essentially disc-shaped commutator 14, which is resiliently acted upon in an axial direction by carbon brushes 15, 16, is mounted with torsional strength on the motor shaft 10. Its contact surface 14 is effective in an axial direction and extends at an right angle to a rotary axis 18 of the electric motor 2.

Means 19, 20 are provided for an axially movable holding device and contacting of the carbon brushes 15, 16 in connection with an axial installation of the unit. As shown in the drawing, the means 19, 20 are provided on the electronic unit 7, thus, together with the carbon brushes 15, 16, they form an electric constructional unit. The carbon brushes are located at the level of the pump housing 5, so that the electric motor 2 is shortened by the dimension of the carbon brushes 15, 16. Besides the carbon brushes 15, 16, no contacting of additional electric components of the electric motor 2 or the pump unit 4 is necessary. As means 19, 20 the electronic unit 7 has two guide elements 21, 22 for the carbon brushes 15, 16, which are effective parallel to the rotary axis 18. Each guide element 21, 22 is axially aligned to the commutator 14 and essentially comprises a box 23, 24 open towards the motor, which has a stop surface 25, 26 at the end. A pressure spring which resiliently prestresses the carbon brushes 15, 16 in the

direction of the contact surface is arranged between the stop surfaces 25, 26 and the carbon brushes 15, 16.

It should be noted that the means 19, 20 can also be integrated in the pump housing 5 separately, i.e. independently of the electronic unit.

According to the embodiment shown in the drawing, the guide elements 21, 22 are arranged at the ends 30, 31 of protruding arms 32, 33, and the number of arms 32, 33 corresponds to the number of carbon brushes. The arms 32, 33 are arranged in a circular path concentrically to the motor shaft 10, and they essentially extend parallel to the axis of the motor shaft 10 in the direction of the commutator 14. As shown in the figure, the arms 32, 33 extend through holes 34, 35 of the pump housing 5 and have sealing elements 36, 37 which bear against the wall of the hole. It should be noted that conducting elements 38, 39, which serve to ensure the electric contacting of the carbon brushes 15, 16, run inside the arms 32, 33 and lead to electric connection elements in the vicinity of the electronic unit 7. Thus no separate electric connection is needed for the electric motor 2.

Basically the motor-driven pump unit is assembled as described below. In a first step the rotor 11, the motor shaft 10, the commutator 14 mounted with torsional strength on the motor shaft and the pushed on bearing elements 40, 41 are inserted axially in a location hole 42 of the pump housing 5, so that the bearing element 41 for the pump eccentric with its pot-shaped bottom lies against the bottom of the location hole 42. In a second step the housing of the electric motor 9 is axially pushed onto the free end of the motor shaft 10 and fastened to the pump unit 4. It would be advantageous if the pot-shaped bottom of the motor housing 9 had a corresponding cup for holding the support bearing 43. In a final step the electronic unit 7 is axially pushed onto the pump unit 4 in the direction of the motor 2, so that arms 32, 33 extend through the pump unit 4. Since the carbon brushes 15, 16 are arranged in an axially movable manner on the electronic unit 7, no measures are needed to retain them in a retracted position, as would be the case in a radial arrangement of the carbon brushes.

[Abstract]**MOTOR-DRIVEN PUMP UNIT****Abstract of the Disclosure**

The invention relates to a motor-driven pump unit, in particular for antilock systems of motor vehicles, with an electric motor [(2)] that is arranged on one side [(3)] of a pump unit [(4)] and an electronic unit [(7)] that is arranged on another side [(6)] of the pump unit [(4)] and fastened thereto. The main aspect of the invention is that means [(19, 20)] are provided for an axially movable attachment and contacting of carbon brushes [(15, 16)] in connection with an axial installation of the unit. In this way, the individual components of the unit can be assembled axially in a simple manner and at low cost. In addition, the unit requires very little space.

[Figure 1]

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PC 8957

Motor-Driven Pump Unit

The present invention relates to a motor-driven pump unit, in particular for antilock systems of motor vehicles, with the characteristics described in the preamble of Patent Claim 1.

A motor-driven pump unit of this type already is disclosed in EP 645 875 B1. It comprises an electric motor arranged on one side of a pump unit and an electronic unit arranged on another side of the pump unit. A commutator is mounted at the shaft end of the electric motor that faces away from the pump, and this commutator is acted upon by radially arranged carbon brushes. A supply line that runs through the motor and pump housing up to the electronic unit supplies power to these carbon brushes. The motor-driven pump unit can be improved, because measures have to be taken that the carbon brushes and the brush holding plate can be lowered radially to the commutator after mounting the rotor and the motor housing. For this reason, special tubular brush-holders for the carbon brushes have been proposed, with which the brushes would be held in a retracted position and could be pushed radially out of the tubular brush-holder in the direction of the commutator after a releasing device is activated. However, the tubular brush-holders are no longer accessible after the brush holding plate and motor housing have been mounted, and this is an added problem.

Another disadvantage is that the overall length of the unit increases in relation to the width of the commutator. Little mounting space and particularly a short overall length count among the basic requirements for a unit for motor vehicles.

Hence, the object of the present invention is to propose a motor-driven pump unit that can be assembled easily and requires only slight space in its assembled state. Furthermore, the contacting between the electrical components is to be simplified.

This object is solved on the basis of the characteristic features of Patent Claim 1 by providing means for an axially movable holding device and for the electric contacting of carbon brushes in connection with an axial installation of the unit. Due to the axially movable arrangement of the carbon brushes, it is no longer necessary to hold back the carbon brushes during certain installation steps on the one hand, and on the other hand the overall length of the entire unit is essentially rendered independent of the width of the commutator because, according to the invention, an axially effective commutator can be used. And, finally, the motor according to the invention does not require a brush holding plate.

Further embodiments of the invention are disclosed in sub-claims in connection with the descriptions and drawing. In the following, the invention is described in detail on the basis of Figure 1, which shows a sectional view of a motor-driven pump unit according to the invention.

A motor-driven pump unit 1 is used especially for antilock systems in motor vehicles. It comprises an electric motor 2, which is mounted on one first side 3 of a pump unit 4 with a pump housing 5 and fastened thereto. An electronic unit 7 with a housing 8 is mounted on another second side 6 of the pump housing 5 and fastened thereto. The electronic unit 7 basically serves to activate electromagnetic valves (not shown) used for regulating the brake pressure in brake

circuits. The electric motor 2 has a pot-shaped housing 9. Inside the housing there is a motor shaft 10 with a rotor 11 that has an armature 12 and windings 13. An essentially disc-shaped commutator 14, which is resiliently acted upon in an axial direction by carbon brushes 15, 16, is mounted with torsional strength on the motor shaft 10. Its contact surface 14 is effective in an axial direction and extends at an right angle to a rotary axis 18 of the electric motor 2.

Means 19, 20 are provided for an axially movable holding device and contacting of the carbon brushes 15, 16 in connection with an axial installation of the unit. As shown in the drawing, the means 19, 20 are provided on the electronic unit 7, thus, together with the carbon brushes 15, 16, they form an electric constructional unit. The carbon brushes are located at the level of the pump housing 5, so that the electric motor 2 is shortened by the dimension of the carbon brushes 15, 16. Besides the carbon brushes 15, 16, no contacting of additional electric components of the electric motor 2 or the pump unit 4 is necessary. As means 19, 20 the electronic unit 7 has two guide elements 21, 22 for the carbon brushes 15, 16, which are effective parallel to the rotary axis 18. Each guide element 21, 22 is axially aligned to the commutator 14 and essentially comprises a box 23, 24 open towards the motor, which has a stop surface 25, 26 at the end. A pressure spring which resiliently prestresses the carbon brushes 15, 16 in the direction of the contact surface is arranged between the stop surfaces 25, 26 and the carbon brushes 15, 16.

It should be noted that the means 19, 20 can also be integrated in the pump housing 5 separately, i.e. independently of the electronic unit.

According to the embodiment shown in the drawing, the guide elements 21, 22 are arranged at the ends 30, 31 of protruding arms 32, 33, and the number of arms 32, 33 corresponds to the number of carbon brushes. The arms 32, 33 are arranged in a circular path concentrically to the motor shaft 10, and they essentially extend parallel to the axis of the motor shaft 10 in the direction of the commutator 14. As shown in the figure, the arms 32, 33 extend through holes 34, 35 of the pump housing 5 and have sealing elements 36, 37 which bear against the wall of the hole. It should be noted that conducting elements 38, 39, which serve to ensure the electric contacting of the carbon brushes 15, 16, run inside the arms 32, 33 and lead to electric connection elements in the vicinity of the electronic unit 7. Thus no separate electric connection is needed for the electric motor 2.

Basically the motor-driven pump unit is assembled as described below. In a first step the rotor 11, the motor shaft 10, the commutator 14 mounted with torsional strength on the motor shaft and the pushed on bearing elements 40, 41 are inserted axially in a location hole 42 of the pump housing 5, so that the bearing element 41 for the pump eccentric with its pot-shaped bottom lies against the bottom of the location hole 42. In a second step the housing of the electric motor 9 is axially pushed onto the free end of the motor shaft 10 and fastened to the pump unit 4. It would be advantageous if the pot-shaped bottom of the motor housing 9 had a corresponding cup for holding the support bearing 43. In a final step the electronic unit 7 is axially pushed onto the pump unit 4 in the direction of the motor 2, so that arms 32, 33 extend through the pump unit 4. Since the carbon brushes 15, 16 are arranged in an axially movable manner on the electronic unit 7, no measures are needed to retain them

in a retracted position, as would be the case in a radial arrangement of the carbon brushes.

Patent Claims

1. A motor-driven pump unit, in particular for antilock systems of motor vehicles, with an electric motor (2) that is arranged on one side (3) of a pump unit (4) and fastened thereto and an electronic unit (7) that is arranged on another side (6) of the pump unit (4) and fastened thereto, **characterized in that** means (19, 20) are provided for mounting carbon brushes (15, 16) in an axially movable manner and for the electric contacting of the carbon brushes (15, 16) in connection with the axial installation of the unit.
2. A motor-driven pump unit according to Claim 1, **characterized in that** the means (19, 20) are arranged at the level of the pump housing (5).
3. A motor-driven pump unit according to one or several of the preceding claims, **characterized in that** the electronic unit (7) is provided with the means (19, 20) for mounting and contacting the carbon brushes (15, 16) in order to form an electric constructional unit.
4. A motor-driven pump unit according to one or several of the preceding claims, **characterized in that** the electronic unit (7) has at least two guide elements (21, 22) for the carbon brushes (15, 16), which are effective parallel to a rotary axis (18).
5. A motor-driven pump unit according to one or several of the preceding claims, **characterized in that** the guide elements (21, 22) are arranged in alignment with a

commutator having a contact surface (17) that is at a right angle to the rotary axis (18).

6. A motor-driven pump unit according to one or several of the preceding claims, **characterized in that** each guide element (21, 22) has a box (23, 24) that is open towards the motor for holding one of the carbon brushes (15, 16) in an axially movable manner.
7. A motor-driven pump unit according to one or several of the preceding claims, **characterized in that** each box (23, 24) is limited by a stop surface (25, 26) at an end facing away from the motor.
8. A motor-driven pump unit according to one or several of the preceding claims, **characterized in that** the stop surface (25, 26) is acted upon by a pressure spring (27, 28), whose other end acts upon a carbon brush (15, 16) in the direction of the commutator (14).
9. A motor-driven pump unit according to one or several of the preceding claims, **characterized in that** the guide elements (21, 22) are arranged at the ends (30, 31) of protruding arms (32, 33).
10. A motor-driven pump unit according to one or several of the preceding claims, **characterized in that** several arms (32, 33) are provided corresponding to the number of carbon brushes (15, 16).
11. A motor-driven pump unit according to one or several of the preceding claims, **characterized in that** the arms

(32, 33) are arranged concentrically to the motor shaft (10).

12. A motor-driven pump unit according to one or several of the preceding claims, **characterized in that** the arms (32, 33) extend parallel to the axis of the motor shaft (10) in the direction of the motor (2).

13. A motor-driven pump unit according to one or several of the preceding claims, **characterized in that** each arm (32, 33) extends through the pump unit (4).

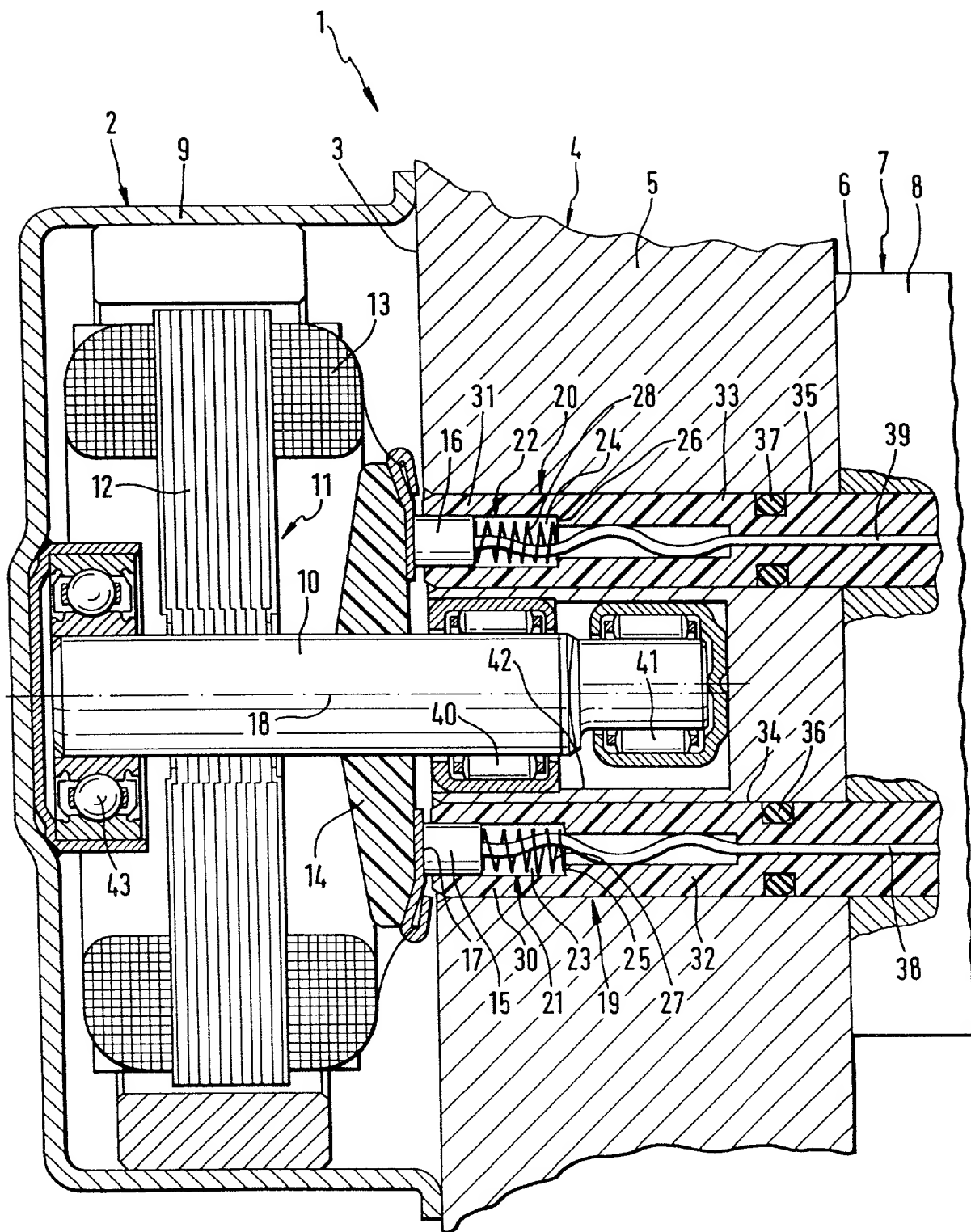
Abstract

The invention relates to a motor-driven pump unit, in particular for antilock systems of motor vehicles, with an electric motor (2) that is arranged on one side (3) of a pump unit (4) and an electronic unit (7) that is arranged on another side (6) of the pump unit (4) and fastened thereto.

The main aspect of the invention is that means (19, 20) are provided for an axially movable attachment and contacting of carbon brushes (15, 16) in connection with an axial installation of the unit. In this way, the individual components of the unit can be assembled axially in a simple manner and at low cost. In addition, the unit requires very little space.

Figure 1

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German Language Declaration

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Prior Foreign Applications
(Frühere ausländische Anmeldungen)

Priority Not Claimed
Priorität nicht beansprucht

197 09 777.4 Germany

10/March/1997

☐

Number Country

Day/Month/Year Filed

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21 JAN 2000

AP8957

Declaration and Power of Attorney for Patent Application

Erklärung für Patentanmeldungen mit Vollmacht

German Language Declaration

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As a below named inventor, I hereby declare that:

daß mein Wohnsitz, meine Postanschrift und meine Staatsangehörigkeit den im nachstehenden nach meinem Namen aufgeführten Angaben entsprechen, daß ich nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent für die Erfindung mit folgendem Titel beantragt wird:

My residence, post office address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

MOTOR DRIVEN PUMP UNIT

deren Beschreibung hier beigelegt ist, es sei denn (in diesem Falle Zutreffendes bitte ankreuzen), diese Erfindung

the specification of which is attached hereto unless the following box is checked:

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International Application Number
PCT/EP98/01366

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I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above and as amended in a preliminary amendment.

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[Page 1 of 3]

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